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Production scheduling at Ardent Mills in Alton, IL

by

Parker A. Smith

A creative component submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Seed Technology and Business

Program of Study Committee:
Dr. Haozhe Chen, Major Professor
Dr. Anthony Townsend, Major Professor

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CHAPTER 1 INTRODUCTION

Ardent Mills is North America's leading flour supplier and grain innovator. There are more than 35 plants throughout the U.S., Canada, and Puerto Rico. Products offered include whole grains, organics, and custom blends. Flour is shipped to the customer in bags for retail and commercial use, in bulk trucks, and on rail cars and barges. The plant in Alton has four mills, 42 elevator wheat bins, 43 bulk flour bins, 6 pack bins, and 12 bulk load-out tanks. Two mills are large and produce most of the flour. One mill is small and produces high-value yet high-demand flours (Ultragrain®). The fourth mill is very small. It is used for scaling-up research trails and milling specialty grains. The annual volume of flour produced in Alton is 6.9 million pounds of flour, but Alton is only considered a medium-sized mill. What makes Alton unique relative to the rest of Ardent Mills is the variety of products at which the mill excels. Alton is able to grind wheat into over 30 different types of flour and blend over 230 custom mixes into 6 package types. That is over twice the variety that other mills can do. This is both rewarding and challenging for Alton. The reward is an increase in business for Alton-made flour, and the challenge is continually discovering ways to increase complexity without impacting the existing workload or compromising safety.

Adding to the complexities in Alton, the mill sits snugly on a piece land between the Mississippi River and Illinois Hwy 100. The mill has experienced catastrophic flooding over the past 60 years. In the past 4 years alone, the mill has been forced to shut down for weeks and months due to flood conditions. This causes urgent coordination between Alton and Denver (Ardent Mills Headquarters) to move Alton customers and orders to other mills for the expected duration of the flood and repair time.

Each plant employs one Production Scheduler. The Scheduler is responsible for what Ardent Mills calls E.L.E.M.E.D.S. – Every Load Every Mill Every Day Safely. Through their daily responsibilities, the Scheduler’s main objective is to ensure every order is fulfilled on time and as expected by the customer. The Scheduler must take data from customer orders as their demand and turn it into supply through management of rough-cut capacity planning, creation of schedules, and coordination of logistics. This includes the mill schedule, pack schedule, bulk truck schedule, bulk rail schedule, appointment schedule, carrier relationship management, and customer relationship management.

Scheduling Tools

The Scheduler uses two primary systems to build and communicate schedules. They are:

(1) PRISM: An in-house, online production management tool used by all mills and blending facilities at Ardent Mills. PRISM is made up of 8 different modules: Elevator, Mill, Pack, Scheduling, Shipments, Inventory, Master Data, and Reports. An employee’s role determines which Modules that employee has access to view and/or edit. This tool is where all parts of the plant enter and communicate data for everyone else to see. The Scheduler uses the Scheduling, Shipments, Master Data, and Reports Modules to create and publish schedules.

(2) COMS: (Customer Order Management System) A remote desktop tool used by Customer Service to communicate customer sales orders to the rest of the company. The Load Status tool and Order Inquiry is also housed in COMS.

CHAPTER 2 PROBLEM DESCRIPTION

The Scheduler's role is one of the most critical ones at the plant. In many occurrences in Ardent Mills Supply Chain, the Scheduler is referred to as "the heartbeat of the plant." Their responsibilities must be covered 5 days a week and when necessary, on the weekends and overnight. Due to the criticality and complex nature of the Scheduler's responsibilities, they must be completed each day to ensure the correct flour is made and loads are shipped as expected. If the Scheduler cannot perform their duties because of personal vacation days or unexpected paid time off, the work must be performed by someone else. At Ardent Mills, a 'Back-up Scheduler' is an unofficial title given to another member of the plant's leadership team who has volunteered to take the Scheduler's place when they are unavailable. It is not required to have a Back-up Scheduler at each plant, while some plants have more than one. To take scheduled time off, the Scheduler must coordinate with the Back-up Scheduler so that the primary responsibilities of the Back-up Scheduler are not compromised. The Back-up Scheduler must make his or herself available to cover the Scheduler's complete work load during the Scheduler's absence. In Alton, there is currently one Back-up Scheduler: The Elevator Manager. The Elevator Manager is planning a role change to a different mill. This will leave an immediate vacancy in the Back-up Scheduler role. To protect the plant from unnecessary production interruptions, it must be determined how to quickly and efficiently train a replacement for the Back-up Scheduler role in the event the Scheduler must have time off from work. The problem that this project will solve is the lack of Scheduling processes and documented information available to the Alton plant. The current Scheduler must do this by 1) Coordinating the discussion of needs among the Alton Leadership team, 2) Create processes that fit Alton's capabilities based on feedback from Alton Leadership,

and 3) Document the processes in an effort to streamline execution regardless of the person performing the work.

CHAPTER 3 METHODOLOGY

When the current Scheduler was hired at Alton in November 2018, it was quickly evident that there were few established Scheduling processes or expectations. Unfortunately, this situation contributed to poor overall plant performance and achievement in the E.L.E.M.E.D.S. metric, relative to the other mills in Ardent. Based on the new Scheduler's experience in Supply Chain and Planning, it was expected by the Plant Manager and Assistant Plant Manager that the new Scheduler create new and update existing processes that were dependable for fostering success within the plant. Over the next 6 months, the Scheduler spent significant time learning the needs of the elevator, mill, PLW, and Transportation group. Through demonstrations of competency and transparency, the Scheduler was able to build a solid rapport with all team members. The Scheduler found that the key to creating good Scheduling processes is learning how to balance each group's needs and how to effectively communicate the proper time to "give and take".

PRISM was implemented across the company in June 2019. At the time, work instructions for individual Modules were distributed to the appropriate employees. These documents were supportive for general guidance in the tool but were found to be lacking by Alton Leadership. During the weeks and months after implementation, Alton Leadership met daily to discuss problems and share new learnings about the system. Most problems and unknowns that were discussed in these meetings were, specifically or loosely, tied to the role of the Scheduler. The current Scheduler in Alton volunteered to 1) compile issues found by team members in Alton and communicate to the PRISM support team, and 2) create an Alton-specific Playbook to be used by

anyone that may find themselves in a scheduling role. It was requested by Alton's Plant Manager that the Playbook explain the best methods the Scheduler has found to use PRISM and a work-instruction for COMS.

CHAPTER 4 PROJECT OUTCOME AND RESULTS

Production Scheduler Playbook

Ardent Mills LLC, Alton, IL

DAILY TIMELINE

6:00 AM Bin Inventory counted (completed by mill) & drop lot inventoried (completed by PLW)

7:00 AM Production Run Cutover in PRISM (completed by mill & PLW)

7:15 AM Inventory added to PRISM (completed by mill)

7:30 AM Yard Check distributed, and late loads communicated

8:00 AM ELEMEDS meeting (led by Production Scheduler)

8:30 AM OH/IL Call with Denver (Scheduler represents Alton)

9:00 AM Daily R&R with Alton Leadership Team (Optional for Scheduler)

9:30 AM ---- Scheduling, order management, and coordination of logistics

Bin Inventory: The bin measurements, taken daily at 6am, 2pm, and 10pm, allow the plant to see the current inventory levels of each flour mix. Accurate bin inventory one of the most critical pieces of information the mill has to fulfill customer orders as expected. A person in the Mill is

responsible for measurement bins and entering data into PRISM. Measurements are converted into the plant's unit of measurement: cwt, or hundred weight. One cwt of flour is equal to 100 lbs. of flour.

PLW (Pack, Loading, and Warehouse): The group of team members responsible for packaging and loading flour into trucks and rail. They are also responsible for managing the flow in the warehouse.

Yard Check: The daily inventory of van trailers sitting in the drop lot. Shows if trailers are empty or loaded, and on what orders on what trailer number.

ELEMEDS Meeting: The Scheduler meets with the Bulk Supervisor, the Pack Supervisor, the PLW Manager, the Senior Head Miller, and the Assistant Plant Manager for updates. The objective is for the Scheduler to understand where each department is on their schedule: what is completed, late, or will be late. This is a time for the group to discuss and resolve any concerns they have that may impact other parts of the mill or cause delays of any kind. The managers of the bulk carrier company arrive for the second half of the meeting to discuss any delays their drivers have or concerns they have regarding loading. From this meeting, the Scheduler must be prepared to communicate any Downtime or late loads, why they occurred, and what is being done to rectify the situation.

OH/IL Call with Denver: The Scheduler represents Alton while the Schedulers from other Illinois and Ohio Mills update the Logistics, Transportation and CSR teams in Denver.

Status of each mill, including planned or unplanned downtime, unforeseen issues, and weekend shut downs. and any delayed or possibly-delayed loads are communicated. The Assistant Plant Manager and Manager of the bulk carrier also join this call.

Daily R&R with Alton Leadership Team: Though not mandatory for the Scheduler to attend, this meeting provides valuable information that the Scheduler can glean. It could be useful to attend at least 2-3 times a week. The meeting is an extremely brief round-table where each part of the plant provides an update on the last 24 hours.

CREATION OF SCHEDULES

For the appropriate amount of supply to be created, the pack and bulk schedules must be created prior to the mill schedule. Appointments are scheduled as requested by van carriers.

Pack Scheduling (see Appointment Scheduling OPL)

Pack lines 1 and 2 should be scheduled in cadence with the mill schedule. If a pack item is scheduled, the mill demand will calculate the flour as needed immediately. Scheduling pack too far in advance will show too much demand up front. This can cause an excess of some flour inventory and a deficit of others.

Cadence

Monday: Schedule Monday through Wednesday

Tuesday: Schedule Tuesday through Thursday

Wednesday: Schedule Wednesday through Friday

Thursday: Schedule Thursday through Monday

Friday: Schedule Friday through Tuesday

Buhler 1: Default 2 days

Buhler 2: Default 2 days

TMI Valve: Default 3 weeks and 4 days

Bulk Scheduling – Trucks (see Bulk Scheduling OPL)

Alton bulk scheduling cadence:

Monday: Schedule Wednesday

Tuesday: Schedule Thursday

Wednesday: Schedule Friday

Thursday: Schedule Saturday, Sunday and Monday

Friday: Schedule Tuesday

No schedules created Saturday or Sunday

Bulk Scheduling – Rail (see Bulk Scheduling OPL)

Rail cars are best scheduled on the weekend due to less bulk truck demand, which frees up labor.

Rail cars usually take 4 hours to complete, adding a few extra hours if the flour is whole wheat.

Alton has space for 14 full or empty rail cars, depending on weather and river water level. Alton is currently serviced on Tuesdays and Fridays. These are the only days rail cars can leave or enter Alton's track yard, unless a special switch is requested. The Rail Bulk Loader will communicate a

map of the rail yard to the Scheduler every day. The map contains the contents and location of each rail car positioned in Alton.

In PRISM, scheduling rail is almost identical to scheduling trucks. Since rail must be planned a week ahead of time, the date range should extend out beyond the coming week. A normal amount of rail car orders for Alton is 1-3 car per week.

Mill Scheduling (see Mill Scheduling OPL)

Alton mill scheduling cadence:

Monday: Schedule Monday through Wednesday

Tuesday: Schedule Tuesday through Thursday

Wednesday: Schedule Wednesday through Friday

Thursday: Schedule Friday through Monday, by 1pm CST

Friday: Schedule Friday through Tuesday

No schedules created Saturday or Sunday

Each day, the pack, truck, and rail schedules need to be completed before analyzing and publishing the mill schedule. Scheduled items drive the Item Demand in the mill schedule and show what and when products need to be milled. It is good practice to verify that inventories of the bulk bins are accurate. Any discrepancies should be updated by the mill immediately, or the scheduler needs to make an adjustment in the “Inv. Adj.” column.

While creating the mill schedule, the Scheduler should be mindful of the inventory of by-products. By-products, such as middle-split, clear (hard and soft), and germ, are created through the milling process of various wheats. Clear and middle-split are lower in value and usually low in demand, but significant quantities are produced by the mill every day. These should be consumed into blends whenever possible to maintain room in the bins. If these bins fill up, the clear and middle-split are sent to feed. This is the lowest valued product and should be kept at a minimum. The balance of producing and consuming by-products is partially responsible for keeping the mill running.

Alton aims to load bulk trucks 24 hours in advance of the scheduled loading time. Pack schedules are created 48 hours out to allow for more efficient runs on the pack lines. Understanding the delivery times and the loading times of orders is helpful in determining what day and time of day the flour run should be scheduled. Pack orders need to be packed and loaded by 7am of their ship day.

The Mills

To prepare the wheat for the milling process, the wheat must temper in swell bins with moisture. Each mill has four swell bins that hold 3 run hours of wheat each. For this reason, mill runs need to be in three-hour increments. Since the ideal temper time is 9-12 hours, changing, adding, or cancelling mill runs within that timeframe should be avoided.

The ideal run is 9-12 hours or longer. The shorter the runs, the more impact to the mill's Overall Equipment Effectiveness (OEE). It is most efficient for the mill to transition between mixes that are close in protein level. This is to reduce the amount of flour spilt to set-off, which becomes

expensive Rework flour. For example, E-mix would transition to O-mix, and then to R-mix. Preferably, there would be a long run of R-mix before transitioning back up in protein to O-mix, then to F-mix, and repeat. If the R-mix run is 6 hours or less, it is normally more efficient, regarding set-off, to skip O-mix and transition directly back to E-mix. With a short R-mix run, there is no OEE benefit going back to O-mix. Also, some of the flour produced is treated with chlorine gas during the milling process as a means to bleaching. The chlorination cannot run on both the A mill and B mill for more than 1 hour at the same time. For example A36 CA46 on the A mill cannot be ground at the same time as F52 CA54 on the B mill.

The OEE Process Monitor is an Excel document created by the Mill every day. It is the place where every production run, change-over, and downtime is recorded. This is a helpful tool when trueing up the mill schedule.

A mill

Max Capacity: 10,000 cwt/day, 390-400 cwt/hour

Type of wheat: Hard Red Winter (HRW)

Types of HRW ground: (E-mix, G-mix, O-mix, and R-mix)

The letter grade of wheat indicates the amount of protein in that variety. The number grade is the level of ash in the flour. The lower the number, the lower the ash.

Flours produced on the A-mill

E48, E52, and E52 CA54: Any combination of E-mix hours can add up to make a multiple of 3. For example, a 12-hour run of E-mix could include 4 hours of E48, 5 hours of E52, and 3 hours of E52 CA54.

G52: This flour is made for a specific customer, Newlyweds, but it is not often ordered. The wheat and flour are considered Yoshon (Kosher). The wheat is expensive, so it is advised to make as little overage as possible.

O53: Avoid creating runs for less than 9 hours at a time.

R54: Avoid creating runs for less than 6 hours at a time.

B Mill (Swing Mill)

Max Capacity: 10,000 cwt/day, 390-400 cwt/hour (slower for Cake and WW flours)

Type of wheat: Mostly SRW, but mill can “swing” to HRW when necessary. The B-mill also grinds whole wheat and organic flour.

Type of SRW ground: A-mix

Types of Whole Wheat ground: A-mix, O-mix, and P-mix

Type of Organic ground: A-mix

Type of HRW ground: F-mix

Flours produced on the B-mill

A48 (Cracker flour)

A48 is the best-selling flour out of Alton. Alton's largest customer purchases almost exclusively A48 flour. In addition, it is the flour most utilized in the Safeguard product family. On average, the B-mill will grind A-mix into A48 5 out of 7 days a week.

Cake Flour (A36 CA54 and others)

When the mill grinds A-mix wheat into cake flour, a by-product called middle split is produced. The result is near 1:1 ratio of middle split and cake flour. Middle split is low-value and must be used in A-mix flour blends whenever possible. Consuming middle split is difficult for the mill, so bin space is always at a premium. This limits the amount of cake-flour that a mill can grind at one time. If the mill runs out of bin space for middle split, they must stop cake production until enough middle split has been consumed.

It is expected that Customer Service provides orders for products that consume middle split around the same ratio that cake orders are entered. To protect the mill from being over-stuffed with middle split, a Secondary Category of Load Status in COMS was created, specifically for cake flour products.

A Whole Wheat (AWW), O-Whole Wheat (OWW), and P-Whole Wheat (PWW)

Normally, A-WW should follow A48 since it's the same wheat. Then O-WW would follow, and then P-WW. Ideally, whole wheats would run when bins are empty and there are loads to pull, so the runs can be as long as possible. Good to do A48 after any WW wheat run. Running whole

wheat is rough on the mill, and changeovers are challenging. It's best practice to run whole wheats together to reduce changeovers and damage to screens.

Organic Pastry flour

Milling Organic flour also requires significant change-over time, so adding this after Whole Wheat is helpful.

F52

Struggles to make lower ash on HRW (we stick to F52 only if we swing the mill).

C Mill

Max Capacity: 1560 cwt/day, 65 cwt/hour. Runs significantly slower than the A and B mills.

Produces Type of Wheat: Blends of SRW and HRW (Ultragrain® products) and whole wheat

Flours produced on the C-mill

Ultragrain® Hard (PUG), Ultragrain® Soft (UG Soft), and Ultragrain® High Performance (HP)

With its relatively small capacity and high demand out of Alton, orders for products made on the C-mill must be scheduled far in advance. It is common for Alton to be oversold on UG products, requiring help from other mills to cover loads. The C-mill can grind about three loads a day (1560 cwt, with no room for downtime). Alton also uses supplemental PUG railcar flour, which can be

blown in at a rate of roughly 3 loads/day. On a good day, the capacity for C-mill *products* is 3 loads of UG Soft, PUG, HP, or AUF, plus 3 additional loads of UG Hard.

A-Whole Wheat Ultrafine (AUF)

The C-mill is the only mill capable of ultra-fine granulation. The transition to AUF from any other run is difficult and time-consuming. The run must be scheduled as long as possible to be efficient.

Whole Wheats: AWW, OWW, and PWW

The C-mill will only run whole wheat if the B-mill is oversold and the C-mill has time to spare. Normally, the C-mill runs 24 hours a day running only Ultragrain, so WW is not ground often on the C-Mill.

Scheduling the C-Mill (see C-Mill Production, Parker Smith)

It may provide better understanding of the C-mill capabilities if orders are managed outside of PRISM. C-mill product data can be exported out of COMS and copied into Excel template to track long-term C-mill scheduling. It is helpful to understand which orders will be covered by supplemental rail PUG flour and which ones need to be milled.

D mill

Max Capacity: 168 cwt/day, 7 cwt/hour

The D-mill can mill any type of grain that Ardent Mills supplies. This mill is extremely small and slow, so it is only effective for a small volume of orders. Examples of grain currently offered are Rye, Chickpea, Sorghum, Millet, Spelt, White Sonora Wheat, and Sustagrain® Barley.

Appointment Scheduling (see Appointment Scheduling OPL)

Due to space constraints, Alton cannot live-load any van trailer without a documented exception from the Transportation Team in Denver. The only three carriers that are currently allowed to live-load are:

Bison International

Roar Logistics

Old Dominion (used for LTL loads)

All other van trailer carriers must drop a clean, empty, food-grade container at the drop lot the day before the load is set to ship.

Carriers will request appointments through email and phone calls. The carrier must provide the PO number for the load they want to schedule, and the date requested for pick up. Sometimes the date of pick up is after the ship date in COMS and PRISM. This is fine, if the appointment is scheduled appropriately in PRISM to allow visibility for the Warehouse Coordinators. Sometimes the carrier will request early pick up. This is allowed only at the discretion of the scheduler and the PLW Manager.

Drumbeat

Drumbeat is a method of consistent, preventative maintenance used by Ardent Mills. It is planned several days in advance, where members of Leadership create work orders and labor schedules to address the immediate and pertinent maintenance issues related to that area of Operations. Drumbeat is a mandatory occurrence in Operations which cannot be altered or cancelled without

permission from the Plant Manager. The Alton plant shuts down parts of the plant every week on a routine schedule. The Drumbeat should be documented in the Mill Schedule whenever scheduled.

Drumbeat Schedule

Week 1:

Tuesday: Pack Line1 & FPZ Sifters (4-8 hours, 1st shift)

Thursday: A-mill (8 hours, 1st shift)

Week 2:

Tuesday: Pack Line 2*

Thursday: B-mill (8 hours, 1st shift)

Friday: C-mill (4 hours, 1st Shift)

*If the tailings are red, FPZ Sifters would be done on both lines on Week 2

ORDER MANAGEMENT AND COMS

Customer Order Management System (COMS) is a remote desktop tool used by Customer Service to communicate customer sales orders to the rest of the company. For the Scheduler, COMS is a tool to view customer order data and manage their mill capacities.

Load Status

Load Status is a tool used by the Production Scheduler to manage production capacities at the mill.

For each Category and day of the week, a production limit is set by the Scheduler in terms of

hundred weights of flour (cwt). This limit is the maximum amount that can be ordered for products in that category on that day. The Scheduler can modify the limits at any time, but the Scheduler on duty is the sole responsible party for Load Status. If the Scheduler is unavailable, Load Status responsibility falls to the Assistant Plant Manager or Plant Manager.

Barring any short-term limitations of which the Scheduler is aware, it is a good strategy for the Scheduler to keep Load Statuses open to maximum capacity for as many categories as possible. This avoids unnecessary communications between Customer Service and the Scheduler when the order would be accepted anyway. There are certain categories, however, that are intentionally set below capacity, because they must maintain in the Scheduler's attention on a daily basis.

If a Customer Service Representative (CSR) tries to place an order, and load status is full for that product, the CSR will reach out to the Scheduler and request Load Status be "opened" (increased) to the number of cwt necessary to allow the load in. It is up to the Scheduler's judgment to allow a load beyond capacity. The Scheduler must consider impacts on the Elevator, the Mill, PLW, Shipping, and ensure the additions are communicated properly. Allowing loads beyond a category's capacity can create major challenges for many.

It is also a good strategy for the Scheduler to zero out Load Status of the current date, next day, and 2 days out. This prevents an order getting placed without the Scheduler knowing about it.

Order Inquiry

COMS is the data repository for Ardent Mills sales order data. Into Sales Orders, Customer Service enters information such as the contact information, the product ordered, and the required dates (from Customer Service) while shipping information is entered by the Mill. Order Inquiry is also

helpful when looking for ways to mine data. Large amounts of information can be compiled, exported to Excel, and analyzed to understand customer and production patterns.

Order Changes, Cancellations, and Add-ons

Within 48 hours of delivery

Since the bulk schedule is already published, the Scheduler must determine if the load has been 1) blended and 2) loaded onto a trailer. If the order is blended to a load-out tank, but not loaded onto a trailer, the paperwork has not yet been “closed out”. This means that the CSR may still make changes to the delivery date and time in COMS. It also means the order can be cancelled and the load can be easily used for another customer or order.

Requests to change a delivery date or time:

The carrier must approve first. Within 48 hours of delivery, most loads have been assigned and drivers have been dispatched. Since many drivers make multiple trips a day, making even slight changes to the schedule can affect other customers’ delivery times. Once the change is approved, the Scheduler must determine if the load is:

Scheduled Bulk, not blended If the scheduled delivery is moving within the timeframe of the published schedules, the change must be hand-written on the current bulk schedules. If the new delivery date falls after the published schedule, the order should be cancelled from (cross-off) the current schedule. Scheduler must then ensure the order publishes based on its new delivery date.

Blended Bulk, not loaded If the load is already blended and sitting in a load-out tank, Scheduler should request that the minilab not load until closer to the new load out time.

Loaded Bulk If the load is already on a trailer, the paperwork has already been closed out and the CSR is unable to update the scheduled delivery. A verbal agreement between Ardent Mills and the carrier must occur to deliver the load at a different time.

Pack loads: Notify the PLW team of the change. Scheduler must ensure that the Transportation team is copied on the request to change delivery. If product is already packed, Scheduler must work with PLW to determine best use for packed product.

Requests to change product, product quantity, ship-to location, or carrier

These requests are rare and need to happen 7 days or more before delivery.

Requests for cancellations

Scheduled Bulk, not blended Scheduler must notify the carrier and the minilab of the cancellation. Cross-off order on bulk schedule.

Blended Bulk, not loaded Scheduler must find the next order of that product for that customer, and plan to use the blended load for that order. That future order is cancelled off the bulk schedule, so it is not blended again. Carrier must be notified of the request for cancellation, and if a loaded trailer will sit idle for any amount of time. Minilab must be notified of the plan.

Loaded Bulk CSR must invoice the customer and issue a refund. Scheduler must work with Minilab and carrier to find the next best use for the loaded trailer. Load must be resampled

Pack loads: Notify the PLW team of the cancellation. Scheduler must ensure that the Transportation team is aware of the cancellation. If product is already packed, Scheduler must work with PLW to determine best use for packed product.

Within 24 hours of delivery

It is Ardent Mills policy to avoid and restrict order changes within 24 hours of the delivery time. At this point, bulk orders are likely loaded onto trailers. To avoid tying up trailers, the customer should be asked to take the load as originally scheduled.

Moving *up* bulk delivery times: At the discretion of both the Scheduler and the carrier.

Moving *out* bulk delivery times: At the discretion of the carrier.

Cancellations If the cancellation is unavoidable, the Scheduler must find the next order of that product for that customer, and plan to use the blended load for that order. That future order is cancelled off the bulk schedule, so it is not blended again. Carrier must be notified of the cancellation and how long the trailer will sit idle.

Pack loads: Notify the PLW team of the cancellation. Scheduler must ensure that the Transportation team is aware of the cancellation. If product is already packed, Scheduler must work with PLW to determine best use for packed product.

Add-ons

An *add-on* is a piece of the schedule created after the full schedule has been published. They are used to communicate additions without disrupting the paper schedules currently being worked on by Mill and PLW crew members. Add-ons can be for bulk truck orders or for the pack lines

Add-ons are disruptive to the plant's processes by impacting the elevator, mill, blending lab, loaders or packer, and logistics. Unfortunately, they are a common occurrence. It is advised that the Leadership Team establish consistent rules for accepting and communicating add-ons.

Cutoffs

Within 24 hours or less for delivery: Accepting the add-on order is up to the Scheduler's discretion, but it should be avoided. The carrier must agree to taking the load. By that time, most carriers have their schedules set and drivers dispatched. The mill schedule is already set, so to take the load, there must be enough flour in the bin. Lastly, the extra load cannot make the plant exceed any of the daily capacities.

Weekend: After the end of business Thursday, no add-ons can be created for Friday, Saturday, Sunday, or Monday. The labor schedule is created on Thursday afternoon, which sets available staffing and capabilities for the entire weekend. The only exception to this rule is if the mill receives written confirmation from the customer that they will shut down production unless they receive the urgent load.

TMI: No add-ons for the TMI pack schedule will be allowed

MOQ (Minimum Order Quantity)

Unlike most other mills, Alton requires a minimum order quantity (MOQ) for all bagged product. Due to change-over time, it is not efficient to run products on the bagging lines for quantities less than 3 pallets for regular flour or 5 pallets for Safeguard. If a product is ordered at a below-MOQ quantity, PLW must still run three pallets. Since the Alton mill does not have adequate warehouse

space to store bagged product, the extra pallets must get used for rework. The results of ordering below MOQ are an inefficient use of time and a loss in profit made on that order.

Regular flour: 3 pallets (150 – 50lb bags or 294 – 25lb bags)

RTE Safeguard flour: 5 pallets (250 – 50lb bags)

At this time, the Customer Service and Sales Organizations in Ardent Mills do not support Alton's requirement of MOQ. Products ordered below MOQ need to be approved by the Plant Manager or Assistant Plant Manager.

Lead Time

Normally, orders for bulk should be entered into COMS 3 or more days before the requested ship dates. Pack orders should be entered at least 7 days out. There are two groups of products that require significantly more lead time than others.

RTE Safeguard®

This is a unique family of products that is only produced at two of Ardent Mills facilities. The flour produced has been specially-treated intended for new specific food product: safely edible cookie dough. Safeguard products offered use blends of A-mix wheat, also in Organic. The flour is needed to mill into specific bins that can be accessed by the Safeguard system. Managed by one of the Assistant Plant Managers, the RTE process of blending Safeguard flour occurs Wednesday through Saturday or Sunday for bulk, and Thursdays for pack on the TMI pack line. Because of the microbes associated with the blending of the flour, all final Safeguard products must be sampled and tested for specific live organisms. Testing requires about 7 days before passing or

failing results are returned. Pack loads are not shipped until the lot has been released. Because Safeguard products are made once a week and testing can take a while, a lead time of 2 weeks is required for bulk loads and 3 weeks from request date to ship date is required for pack.

Specialty Products

As discussed earlier, Alton is one of the only mills that can conduct small mill runs of high-value Specialty products for research and sales. These opportunities happen about every two months, with several orders at a time. Usually, planning for milling, packing, and shipping takes several weeks to plan. Alton does not store any raw material for Specialty Products. They must be trucked to the plant in totes (bulk bags). Once they arrive, the raw grain must be blown up to the mill bin floor. Since the D-mill is extremely slow, it will likely take all week to mill one truck load. Bagging is sometimes a challenge due to a naturally different consistency of the Specialty Grain. For these reasons, orders are usually placed 3-6 weeks in advance.

CHAPTER 5 CONCLUSION

After 9 months of meetings, design, and feedback, The Production Scheduler Playbook is in the final draft of development. The development of these processes was not without challenges. The biggest challenge was communicating the value of these changes to a culture that has not been asked make changes in a very long time. Using patience and active listening, the Scheduler was able to help create a level of trust and transparency between organizations in the mill. The document clearly details the Scheduler's daily and weekly cadence for creating bulk schedules, order management, and capacity planning for the Alton mill. Work instructions for COMS and

Alton-specific processes for PRISM are also included. The key benefits the Scheduler Playbook offers are 1) efficient and popular scheduling processes now exist in Alton, 2) consistency in processes regardless of the person doing the work, 3) formalized documentation of agreements made by different parts of the plant, and 4) a better work-life balance for the Scheduler at the Alton mill. The Production Scheduler Playbook is meant to act as a reference guide for the current Scheduler, as well as designated Back-Up(s). In the future, it is possible the document may need modifications. The entire document should remain evolving document as processes and roles change over time.

CHAPTER 6 REFERENCES

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